

### **AMENDMENTS TO THE CLAIMS**

Please amend claims as set forth below.

1. (Currently amended) A method of automatic translation of sentences from a source language  $L_s$  selected from language  $L_1$  to  $L_n$  to a target language  $L_t$  selected from languages  $L_1$  to  $L_n$ , in which steps thereof are implemented by a computer, comprising the steps of :

- (i) providing grammars  $G_1$  to  $G_n$  of all the languages  $L_1$  to  $L_n$  respectively, in which each grammar is unique to that particular language, and a text 'S' in the source language  $L_s$  as inputs;
- (ii) creating a unified grammar specification UG for the grammars  $G_1$  to  $G_n$ , in which equivalent grammar production rules of each grammar  $G_1$  to  $G_n$  are combined into a single unified production rule;
- (iii) separating the input text 'S' in the source language  $L_s$  into a list of tokens using a lexical analyser for the source language  $L_s$ ;
- (iv) setting a current non-terminal symbol to the start symbol of the unified grammar specification UG;
- (v) obtaining a set of the grammar production rules from the united grammar specification UG, which contain the current non-terminal symbol as their target non-terminal;
- (vi) for each unified grammar production rule P in the set of the grammar production rules obtained from the previous step (v), taking each symbol one by one from a list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$ , determining whether it is a terminal symbol or a non-terminal symbol;
- (vii) for each terminal symbol obtained from the previous step, which is equivalent to a corresponding symbol in the list of tokens T of the input text in the source language  $L_s$ , considering the next symbol in said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  and for each non-terminal symbol  $E_s$  obtained from the previous step, repeating step (v) onwards with  $E_s$  as the current non-terminal symbol;
- (viii) if all the symbols in the said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  match with all the symbols in the list of tokens T of the input text in the source language  $L_s$ , obtaining a list of symbols t corresponding to the target

language grammar  $G_t$  from the unified grammar production rule  $P$  and for those symbols which do not match, repeating step (vi) onwards for a next unified grammar production rule  $P$  defined for the non-terminal symbol 'E';

(ix) taking each symbol one by one, from the list of symbols  $t$  corresponding to the target grammar  $G_t$  and determining whether it is a terminal symbol or a non-terminal symbol;

(x) for each terminal symbol obtained from the previous step outputting the symbol, and considering the next symbol and for each non-terminal obtained from the previous step, obtaining another unified grammar production rule  $P$  corresponding to that non-terminal symbol and repeating the previous step with the new unified grammar production rule, till all the symbols in the list of symbols  $t$  corresponding to the target language grammar  $G_t$  are exhausted.

2. (Original) The method as claimed in claim 1, wherein the unified grammar specification  $UG$ , for the grammars  $G_1$  to  $G_n$  of languages  $L_1$  to  $L_n$ , is created by the steps of:

(i) for every production rule  $P$  of the grammars  $G_1$  to  $G_n$ , of the languages  $L_1$  to  $L_n$ , defining a unified production rule  $P_1$  in the unified grammar specification  $UG$  having the target non-terminal symbol of the production rule  $P$  as its target non-terminal symbol; and

(ii) for each grammar  $G_1$  to  $G_n$  creating a list of terminal symbols and/or non-terminal symbols in the said production rule  $P_1$  and adding each and every symbol in the list of terminal symbols and/or non-terminal symbols that are represented by the target non-terminal symbol in the production rule  $P$  to the said unified production rule  $P_1$  and repeating previous step for the next production rule of the grammars  $G_1$  to  $G_n$ .

3. (New) An apparatus for automatic translation of sentences from a source language  $L_s$  selected from language  $L_1$  to  $L_n$  to a target language  $L_t$  selected from languages  $L_1$  to  $L_n$  comprising:

(i) means for providing grammars  $G_1$  to  $G_n$  of all the languages  $L_1$  to  $L_n$  respectively, in which each grammar is unique to that particular language, and a text 'S' in the source language  $L_s$  as inputs;

(ii) means for creating a unified grammar specification UG for the grammars  $G_1$  to  $G_n$ , in which equivalent grammar production rules of each grammar  $G_1$  to  $G_n$  are combined into a single unified production rule;

(iii) means for separating the input text 'S' in the source language  $L_s$  into a list of tokens using a lexical analyser for the source language  $L_s$ ;

(iv) means for setting a current non-terminal symbol to the start symbol of the unified grammar specification UG;

(v) grammar production rule obtaining means for obtaining a set of the grammar production rules from the united grammar specification UG, which contain the current non-terminal symbol as their target non-terminal;

(vi) for each unified grammar production rule P in the set of the grammar production rules obtained from the grammar production rule obtaining means, symbol taking means for taking each symbol one by one from a list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$ , determining whether it is a terminal symbol or a non-terminal symbol;

(vii) for each terminal symbol obtained from the symbol taking means, which is equivalent to a corresponding symbol in the list of tokens T of the input text in the source language  $L_s$ , means for considering the next symbol in said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  and for each non-terminal symbol  $E_s$  obtained from the symbol taking means, repeating obtaining a set of the grammar production rules from the united grammar specification UG by the grammar production rule obtaining means, onwards with  $E_s$  as the current non-terminal symbol;

(viii) if all the symbols in the said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  match with all the symbols in the list of tokens T of the input text in the source language  $L_s$ , means for obtaining a list of symbols t corresponding to the target language grammar  $G_t$  from the unified grammar production rule P and for those symbols which do not match,

repeating taking each symbol one by one from a list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  by the symbol taking means, onwards for a next unified grammar production rule  $P$  defined for the non-terminal symbol 'E';

(ix) determining means for taking each symbol one by one, from the list of symbols  $t$  corresponding to the target grammar  $G_t$  and determining whether it is a terminal symbol or a non-terminal symbol;

(x) for each terminal symbol obtained from the determining means, means for outputting the symbol, and considering the next symbol and for each non-terminal obtained from the determining means, means for obtaining another unified grammar production rule  $P$  corresponding to that non-terminal symbol and repeating the determining means with the new unified grammar production rule, till all the symbols in the list of symbols  $t$  corresponding to the target language grammar  $G_t$  are exhausted.

4. (New) A computer readable medium for automatic translation of sentences from a source language  $L_s$  selected from language  $L_1$  to  $L_n$  to a target language  $L_t$  selected from languages  $L_1$  to  $L_n$ , including program instructions executable by a computer system for:

(i) providing grammars  $G_1$  to  $G_n$  of all the languages  $L_1$  to  $L_n$  respectively, in which each grammar is unique to that particular language, and a text 'S' in the source language  $L_s$  as inputs;

(ii) creating a unified grammar specification  $UG$  for the grammars  $G_1$  to  $G_n$ , in which equivalent grammar production rules of each grammar  $G_1$  to  $G_n$  are combined into a single unified production rule;

(iii) separating the input text 'S' in the source language  $L_s$  into a list of tokens using a lexical analyser for the source language  $L_s$ ;

(iv) setting a current non-terminal symbol to the start symbol of the unified grammar specification  $UG$ ;

(v) obtaining a set of the grammar production rules from the unified grammar specification  $UG$ , which contain the current non-terminal symbol as their target non-terminal;

(vi) for each unified grammar production rule  $P$  in the set of the grammar production rules obtained from the previous step (v), taking each symbol one by one from a list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$ , determining whether it is a terminal symbol or a non-terminal symbol;

(vii) for each terminal symbol obtained from the previous step, which is equivalent to a corresponding symbol in the list of tokens  $T$  of the input text in the source language  $L_s$ , considering the next symbol in said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  and for each non-terminal symbol  $E_s$  obtained from the previous step, repeating step (v) onwards with  $E_s$  as the current non-terminal symbol;

(viii) if all the symbols in the said list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar  $G_s$  match with all the symbols in the list of tokens  $T$  of the input text in the source language  $L_s$ , obtaining a list of symbols  $t$  corresponding to the target language grammar  $G_t$  from the unified grammar production rule  $P$  and for those symbols which do not match, repeating step (vi) onwards for a next unified grammar production rule  $P$  defined for the non-terminal symbol 'E';

(ix) taking each symbol one by one, from the list of symbols  $t$  corresponding to the target grammar  $G_t$  and determining whether it is a terminal symbol or a non-terminal symbol;

(x) for each terminal symbol obtained from the previous step outputting the symbol, and considering the next symbol and for each non-terminal obtained from the previous step, obtaining another unified grammar production rule  $P$  corresponding to that non-terminal symbol and repeating the previous step with the new unified grammar production rule, till all the symbols in the list of symbols  $t$  corresponding to the target language grammar  $G_t$  are exhausted.